UNIVERSITI SAINS MALAYSIA

First Semester Examination
2016/2017 Academic Session

December 2016 / January 2017

CST332 – Internet Protocols. Architecture & Routing
[Protokol, Seni Bina & Penghalaan Internet]

Duration : 2 hours
[Masa : 2 jam]

INSTRUCTIONS TO CANDIDATE:
[ARAHAN KEPADA CALON:]

- Please ensure that this examination paper contains **FOUR** questions in **SIX** printed pages before you begin the examination.

  *[Sila pastikan bahawa kertas peperiksaan ini mengandungi **EMPAT** soalan di dalam **ENAM** muka surat yang bercetak sebelum anda memulakan peperiksaan ini.]*

- Answer **ALL** questions.

  *[Jawab **SEMUA** soalan.]*

- You may answer the questions either in English or in Bahasa Malaysia.

  [Anda dibenarkan menjawab soalan sama ada dalam bahasa Inggeris atau bahasa Malaysia.]

- In the event of any discrepancies, the English version shall be used.

  [Sekiranya terdapat sebarang percanggahan pada soalan peperiksaan, versi bahasa Inggeris hendaklah diguna pakai.]

1. (a) A2 Berhad will be opening a new branch in Penang. As network administrator, you are required to design and maintain the new branch network. Describe **two** (**2**) advantages of using hierarchical model when designing the network.

*A2 Berhad akan membuka cawangan baru di Pulau Pinang. Sebagai pentadbir rangkaian, anda dikehendaki mereka bentuk dan mengekalkan rangkaian cawangan baru. Jelaskan **dua** (**2**) kelebihan menggunakan modal hierarki semasa mereka bentuk rangkaian tersebut.*

(6/100)

(b) Explain the process of frame forwarding in a switched network.

Terangkan proses penghantaran bingkai dalam rangkaian suis.

(8/100)

(c) (i) Describe the differences between collision domain and broadcast domain.

Terangkan perbezaan di antara domain perlanggaran dan domain penyiaran.

(4/100)

(ii) Explain the effect of adding a traditional switch with its default configuration on broadcast domain.

Terangkan kesan menambah suis traditional dengan konfigurasi lalai pada domain penyiaran.

(3/100)

(iii) Refer to Figure 1, identify the number of collision domain and broadcast domain in the network.

Merujuk kepada Rajah 1, kenal pasti bilangan domain perlanggaran dan domain penyiaran.

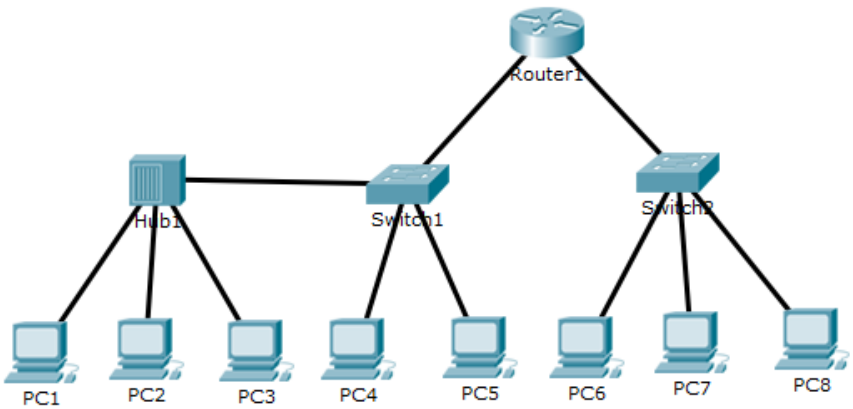

Figure 1/*Rajah 1*

(2/100)

(iv) Refer to Figure 2, identify the number of collision domain and broadcast domain in the network.

Merujuk kepada Rajah 2, kenal pasti bilangan domain perlanggaran dan domain penyiaran.

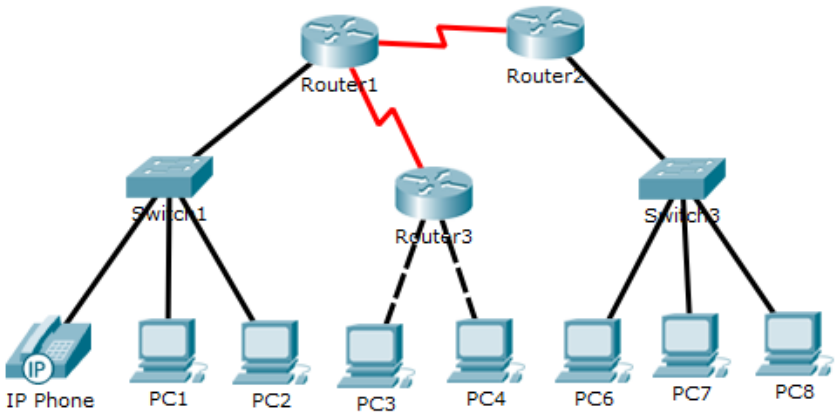

Figure 2/*Rajah 2*

(2/100)

2. The ISP has allocated the IP subnet of 202.123.23.0/24 to ABD Sdn Bhd. The topology of the network is shown in Figure 3. You are required to design the addressing scheme based on the number of hosts and servers in each sub-networks and complete the Table 1 .
Note: All the switches are not configured to be remotely accessed.

ISP telah memperuntukkan subnet IP 202.123.23.0/24 kepada ABD Sdn Bhd. Topologi rangkaian ditunjukkan dalam Rajah 3. Anda dikehendaki merekabentuk skema berdasarkan bilangan hos dan pelayan dalam setiap sub-rangkaian dan lengkapkan Jadual 1.
Nota: *Semua suis tidak dikonfigurasikan untuk diakses dari jauh.*

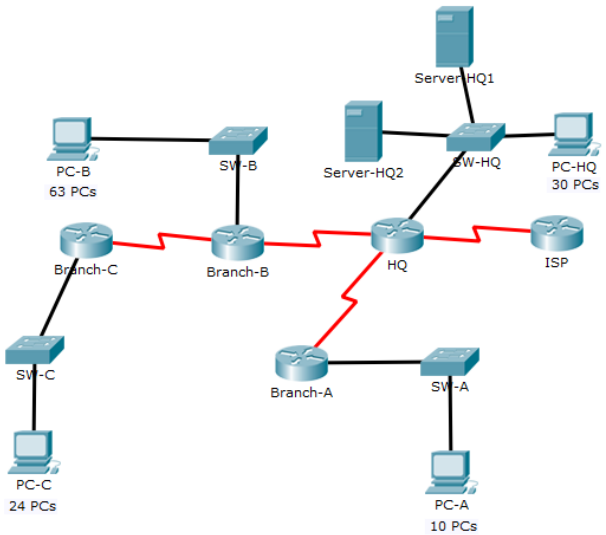

Figure 3/*Rajah 3*

Table 1/*Jadual 1*

Location ***Lokasi***	**Interface** ***Antara muka***	**Subnet Address** ***Alamat Subnet***	**Netmask** ***Topeng Rangkaian***	**Number of Usable Address** ***Nombor Alamat yang boleh digunakan***	**Broadcast Address** ***Alamat Siaran***
HQ	Ethernet				
	HQ - Branch A Link			N/A	
	HQ - Branch B Link			N/A	
Branch A	Ethernet				
Branch B	Ethernet				
	Branch B - Branch C Link			N/A	
Branch C	Ethernet				

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3. Figure 4 shows the routing table generated by Variable Length Subnet Mask (VLSM) aware Routing Protocol:

Rajah 4 menunjukkan jadual penghalaan yang dijanakan oleh Protokol Penghalaan Topeng Subnet Berpanjangan Boleh Ubah (VLSM):

```
R1# show ip route
192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.1.0/24 is directly connected, GigabitEthernet0/0
L       192.168.1.1/32 is directly connected, GigabitEthernet0/0
O    192.168.2.0/24 [110/65] via 192.168.12.2, 00:32:33, Serial0/0/0
O    192.168.3.0/24 [110/65] via 192.168.13.2, 00:31:48, Serial0/0/1
192.168.12.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.12.0/30 is directly connected, Serial0/0/0
L       192.168.12.1/32 is directly connected, Serial0/0/0
192.168.13.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.13.0/30 is directly connected, Serial0/0/1
L       192.168.13.1/32 is directly connected, Serial0/0/1
192.168.23.0/30 is subnetted, 1 subnets
O       192.168.23.0/30 [110/128] via 192.168.12.2, 00:31:38,
       Serial0/0/0
[110/128] via 192.168.13.2, 00:31:38, Serial0/0/1
```

Figure 4/*Rajah 4*

(a) Name **three** (**3**) VLSM enabled routing protocols that can be used as Interior Gateway Protocols. Identify **two** (**2**) differences between these VLSM enabled routing protocols.

*Nyatakan **tiga** (**3**) Protokol Penghalaan bersifat VLSM yang diguna sebagai Protokol Get Dalaman. Kenal pasti **dua** (**2**) perbezaan di antara protocol-protokol penghalaan tersebut.*

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(b) The destination IP address of a given data packet is 192.168.2.25.

Alamat Detinasi IP suatu paket adalah 192.168.2.25.

(i) Will the packet be dropped or forwarded?

Adakah paket tersebut digugurkan atau dimajukan?

(ii) If forwarded, which interface will that packet be sent on? Explain the reason for your answer.

Sekiranya dimajukan, antara muka yang manakah akan digunakan untuk memajukan paket tersebut. Terangkan jawapan anda.

(4/100)

(c) The destination IP address of a given data packet is 192.168.13.10.

Alamat Detinasi IP suatu paket adalah 192.168.13.10.

(i) Will the packet be dropped or forwarded?

Adakah paket tersebut digugurkan atau dimajukan?

(ii) If forwarded, which interface will that packet be sent on? Explain the reason for your answer.

Sekiranya dimajukan, antara muka yang manakah akan digunakan untuk memajukan paket tersebut. Terangkan jawapan anda.

(4/100)

(d) If the router has learned about Network A from static routing and VLSM enabled routing protocols, distinguish which path to Network A will the router installed in the routing table. Justify your respond.

Sekiranya penghala telah mempelajari rangkaian A dari penghalaan statik dan protokol penghala VLSM, jalan manakah yang penghala akan pasang dalam jadual penghalaan? Justifikasikan jawapan anda.

(8/100)

4. (a) There are different ways to auto-configure IPv6 addresses for hosts in a network. State **two** (**2**) techniques used by IPv6 and describe the operation of each of these techniques.

*Terdapat pelbagai cara konfigurasi hos automatic untuk rangkaian IPv6. Nyatakan **dua** (**2**) teknik yang digunakan oleh IPv6 dan jelaskan operasi setiap teknik-teknik tersebut.*

(12/100)

(b) List **three** (**3**) benefits and **three** (**3**) drawbacks of Network Address Translation (NAT).

*Senaraikan **tiga** (**3**) faedah dan **tiga** (**3**) kelemahan Terjemahan Alamat Rangkaian (NAT).*

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(c) The network administrator of XYZ Sdn Bhd has decided to connect the main office with three other remote branch offices using point-to-point serial links as shown in Figure 5. Discuss why Open Shortest Path First (OSPF) is suitable to be used as the routing protocol between the main office and remote branch offices. Provide reasons why other routing protocols such as Routing Information Protocol (RIP) and static routing should not be considered.

Pentadbir rangkaian XYZ Sdn Bhd telah memutuskan untuk menyambung pejabat utama dengan tiga pejabat cawangan jauh menggunakan pautan bersiri titik-ke-titik seperti yang ditunjukkan dalam Rajah 5. Bincangkan mengapa "Open Shortest Path First (OSPF)" sesuai digunakan sebagai protocol penghalaan antara pejabat utama dan pejabat cawangan jauh. Berikan sebab mengapa protokol penghalaan lain seperti "Routing Information Protocol (RIP)" dan penghalaan statik tidak dipertimbangkan.

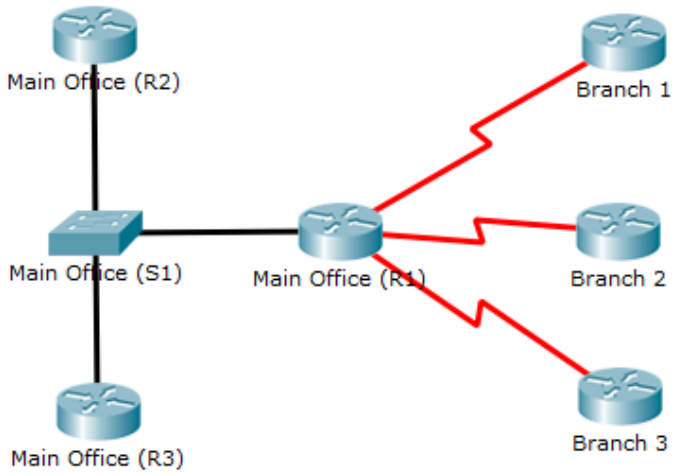

Figure 5/*Rajah 5*

(7/100)